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ABSTRACT

This paper describes an online technology course at Middle Tennessee State University that meets the needs of many preservice teachers and models techniques that can be applied in their K-12 classrooms. The first section describes the self-pacing online technology approach, including the following components of the online model: World Wide Web-based materials; criterion-based assessment system; reflective feedback; pacing; peer sharing and conferencing; and alternate computer stations. Performance and effects of self-pacing are discussed in the second section, including recorded reflections of online self-pacing student actions and anxiety level with regard to difficulty in asking questions and increase in student confidence. The third section summarizes positive and negative aspects of the online classes related to previous computer experience, lack of self motivation, whether the student is actually doing the work, what the online student misses, the need for a chat room or buddy system, and meeting student needs. (MES)

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# Self-Pacing Online Technology Approach: The Preservice Teacher Course

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## Preparing the Preservice Teacher to Use Technology in the Classroom

One of the major problems facing teachers in K – 12 classrooms today is finding enough time to teach students who have an ever-widening range of academic abilities. In addition, with the recent nationwide accountability movement, classroom teachers are under increasing pressure to identify the academic level of their students and then to help them reach their full potential. By designing preservice technology courses that model instructional strategies and that enable students to work at their own pace, teacher educators are providing a method for students to use while learning that they can apply in their own classrooms. Due to work, family responsibilities, and scheduling conflicts, many pre-service university students need the flexibility of taking courses "online." This online technology course meets the needs of many pre-service teachers and models techniques than can be applied in their K-12 classrooms.

## Self-Pacing OnLine Technology Approach

In the "teacher-in-training" technology courses offered by the Department of Educational Leadership at Middle Tennessee State University, web-based instruction has successfully assisted the process of training preservice students for the challenge of the academically diverse classroom. By facilitating instruction in a way that mirrors the self-pacing so desperately needed to meet the needs of students within a classroom, the preservice course enables students to work at their own pace. They begin at their individual level of technological literacy and moving forward. The course—designed to train the preservice student, as well as, the practicing teacher—utilizes the Internet in order to help students integrate technology into lesson plans and units of instruction. Over the past five years, we have experimented in our *SPSE 322 – Technology in Teaching* course with how to vary the rate of instruction in order to produce the highest rate of learning for all students in the academically diverse groups of future teachers. The course is offered by two different methods:

1. Online class with no scheduled classes except a performance review at the end of the semester to verify that the student actually did the work contained in their portfolio.
2. Regularly scheduled classes that meet in the Technology Lab

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In order to allow self-pacing, we have facilitated the Sanders Self-Pacing OnLine Model for Classrooms with Varying Student Abilities. Components of the online model include:

1. *Web-based Materials* – Using web-based instructional materials with two different delivery methods which include non-scheduled instruction which allows students to work on their own using

website instructions and e-mail, or occasionally attend scheduled classes for help in the completion of assignments.

2. *Criterion-Based Assessment System* – Employing a criterion-based assessment system, which enables students to submit materials via e-mail, which is then examined by the instructor. This process also provides an opportunity for the instructor to offer suggestions on how to professionally complete assignments and meet mastery learning objectives. There are 10 assignments (portfolio sections – see on website listed at the end of this document).

3. *Reflective Feedback* – Utilizing the process of reflective feedback as students complete each section of their "portfolio" which allows students to rethink, rework, and resubmit each section in order to reach an acceptable or mastery level. In addition, the process provides additional practice on computers and reinforces specific concepts and technological skills.

4. *Pacing* – Encouraging students to work at their own pace—even if this means working ahead of the suggested schedule. A schedule of due dates is posted on the Internet site. The assignments can be submitted in any order.

5. *Peer Sharing and Conferencing* – Providing opportunities for students to share and conferencing about projects and products. A list of the students' email addresses is sent to each student. The instructor matches students with expertise with students who need assistance in completing a particular Portfolio Section. By encouraging peer sharing and conferencing, the course provides a means for scaffolding with another, more capable person—which is the type of assisted, social learning based on the work of Vygotsky and suggested by Dixon-Krauss (1996).

6. *Alternate Computer Stations* – Empowering students by enabling them to work at off-site computer stations—within the home, computer lab, or library—in order to provide the best possible situation that will foster technological literacy while addressing learning styles and individual pacing.

In addition, a course website is used ( http://www.mtsu.edu/~jsanders ). The site assists the instructors in:

- Providing examples of each project and assignment
- Developing a course calendar for scheduling specified times for in-class instruction as well as due dates for projects
- Enabling students to view course materials from alternate computer

stations

- Making available animated PowerPoint presentations which are utilized throughout in-class instruction, as well as, at alternate computer sites

The outcome of the course is a professional technology portfolio, upon which the final grade is based. The technology portfolio becomes part of the larger professional portfolio, which is required to complete the student teaching experience.

**Performance and Effects of Self-Pacing**

Through the five years that the course has been offered, instructors have kept field journals and completed informal reflections on observations as students engage in computer-assisted activities, complete assignments, and conference with peers. Using the three types of learner groups mentioned above, the following recorded observations are offered for teacher educators in Table 1.

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Table 1.

Recorded Reflections of OnLine Self-Pacing Student Actions

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*Group 1 – Advanced Computer User/Fast-Paced Learner (10 to 15%)*
Require little or no additional instruction
Usually work ahead of schedule using the website for reference and instruction
Submit assignments on time or ahead of schedule

*Group 2 – Intermediate Computer User/Average-Paced Learner (70 to 80%)*
Gain knowledge from information on the website, from the instructor, or each other.
Require little assistance from instructor
Submit assignments on time

*Group 3 – Beginner Computer User/Slow-Paced Learner (10 to 15%)*
Require substantial online and personal assistance from the instructor
Receive assistance from peers – usually the Average-Paced Learners
Submit assignments varying from "late" to "on time"

Note: A pre-registration screening process is used to discourage beginning computer users from taking this course in the online mode. Since their frustration level is very high and they can seldom complete the online course, they are referred to the regularly scheduled classes.

Reflections recorded by course instructors (Middle Tennessee State

University *SPSE 322 – Technology in Teaching*) over a period of two years.

All three groups of learners generally meet the target due dates for each section of the technology portfolio. The advanced group/fast-paced learners usually turn in completed portfolios early—ranging from a few days early to several weeks before the semester ends. The intermediate group/average-paced learners, as well as, the beginner group/slow-paced learners submit completed technology portfolios usually on the last day of class. The overall quality and professional appearance is similar for all three groups. The use of creative images, animation, and additional features is scattered with no obvious pattern and seems to be based on the individual student's interest level rather than their pacing group.

Based on teacher observation and informal reflections, the apparent anxiety level, difficulty in asking questions, and increase in student confidence falls into the following general categories as shown in Table 2.

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Table 2.

Anxiety Level With Regard to Difficulty in Asking Questions and Increase in Student Confidence

*Group One – Advanced Computer User/Fast-Paced Learner*
Anxiety level increases slightly or remains unchanged throughout the semester as assignments are completed. Confidence level increases throughout the semester

*Group Two – Intermediate Computer User/Average-Paced Learner*
Anxiety level is high at the beginning of the semester and decreases as assignments are completed. Confidence level increases at a constant rate throughout the semester

*Group Three – Beginner Computer User/Slow-Paced Learner*
Anxiety level is very high at the beginning and remains high through most of the semester before decreasing some near the end of the semester. If they complete the course, their confidence increases very slowly at the beginning of the semester and then increases dramatically as the semester draws to a close. (See Note above)

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Reflections recorded by course instructors (Middle Tennessee State University *SPSE 322 – Technology in Teaching*) over a period of two years.

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In general, the self-pacing approach has been successful and appears to work

well for all three groups of students. The end products—student knowledge gain, technological literacy, and computer skills—are evenly distributed across all three levels of learners. The big difference between this approach and a more traditional approach to technology instruction where a strict schedule for submitting assignments is adhered to is that the amount of assistance and time the instructor is able to provide each student can be altered to meet the needs of individual learners.

**Online Classes**

We have offered this course in an online (Internet-based) mode for 3 semesters. The students work on their own from remote locations. They follow the instructions found on the Internet Site: http://www.mtsu.edu/~jsanders/322-on.htm and attach the portfolio section files to their emails to the instructor. The instructor critiques each assignment and makes appropriate comments or suggestions for the student to follow. The assignment can be resubmitted as many times as necessary to get it to a "professionally accepted standard." The following is a list of the positive and negative aspects of this method:

- **Previous computer experience** – we have found that the instructor must carefully screen the students to determine if they have sufficient computer skills to be able to handle the online mode. Even after screening some of the students lack the computer skills to be able to effectively process the workload. Five to ten percent of online students come to the regularly scheduled classes or to the instructor's office for extra help.
- **Lack of Self Motivation** – A small percentage of the online students do not have the self discipline to get the assignments completed and submitted by the due dates. The students can submit the Portfolio Sections in any order as long as they submit a section for each due date. If a student falls behind schedule, the instructor reminds them of the importance of setting priorities and staying on schedule. If they cannot keep up, then it is suggested that they switch to the regularly scheduled classes.
- **Who's Doing the Work**? – There is always the question "is the student actually doing the work" without too much help that might hinder them from gaining the desired knowledge and skills. We have a scheduled 2-hour Performance Review at the end of the semester to verify that the student has mastered the basic skills & knowledge. We use 3 short assignments and if the student does not demonstrate proficiency, then they do not pass the course. Assuming that they pass the Performance Review, then their grade is based on the completed, bound portfolio that is kept by the instructor.
- **What do they miss**? The online student misses the modeling of the use of technology in the classroom. However, our courses are sequenced so that they are exposed this in other courses where they have to use technology to present their lesson to their peers.
- **Chat Room or Buddy System Needed** – A survey of the previous online classes revealed that they need to be able to ask for help at times when the instructor is not online. We will be starting a Chat Room, Listserv, and/or a Buddy System to help provide that assistance. Presently, in addition to the instructors assistance, we refer one student who needs help to another student who is very proficient in their particular area. This has worked well, but apparently does not fill the void for some students.
- **Online Mode Meets Student Needs** – The online mode has been successful because it meets the needs of students who have scheduling or time conflicts. It also promotes planning and self-motivation which are skills that the preservice or new teacher need to be able to survive their first classroom experience.

**Reflections and Summary**

If teacher educators must assist preservice students in becoming technologically literate, they must design technology courses that enable students to become skilled at integrating technological applications into instruction, as well, as allowing for individual student differences. The "online" method described and the reflections provided are just one way instructors have successfully assisted students in creating a professional technology portfolio as they develop the skills needed for the classroom. As part of the president's educational technology initiative, a challenge for all students to become technologically literate was issued to America. The challenge falls directly on teacher educators who have the opportunity to provide modeled instructional practices that integrate technology into the curriculum and that enable all students to work at their own pace in becoming technologically literate. By seeking successful practices, such as, the one described, we can facilitate learning while fostering the level of technological literacy needed by future teachers.

**References**

Craig, D.V. (1997). When the learner is in charge: Technological literacy patterns in student generated inquiry projects for fifth graders. Dissertation Abstracts International, D-1341.

Dixon-Krauss, L. (1996). Vygotsky in the classroom: Mediated literacy instruction and assessment. White Plains: Longman Publishers.

Teachers and technology: making the connection. OTA report summary. (1995). Washington DC: U.S. Government Printing Office.

**Additional Resource**

*Technology in the Classroom –SPSE 322* website URL:

- Click http://www.mtsu.edu/jsanders and
- click "SPSE 322"(http://www.mtsu.edu/~jsanders/322.htm ) for regular class and
- click "322 OnLine" (http://www.mtsu.edu/~jsanders/322-on.htm ) for the online class.

**Self-Pacing Technology Approach: The Preservice Teacher Course**
**Online & Regularly Scheduled Classes**

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**Preparing the Preservice Teacher for the Classroom**

One of the major problems facing teachers in K – 12 classrooms today is finding enough time to teach students who have an ever-widening range of academic abilities. In addition, with the recent nationwide accountability movement by state boards of education, classroom teachers are under increasing pressure to identify the academic level of their students and then to help them reach their

full potential. Although these goals are worthy, it gets increasingly more difficult for teachers to help every student meet their individual learning needs. However, in many classroom situations, teachers to meet the needs of an academically diverse student body are utilizing technology and technological applications. Among technological applications available to classroom teachers are the Internet-connected computer, networked computer labs, Internet-based courses, and the world wide web—all of which assist in individualizing educational experiences (ERIC doc. 94-6, 1999).

By designing preservice technology courses that model instructional strategies and that enable students to work at their own pace, teacher educators are providing a method for students to use while learning that they can apply in their own classrooms.

**Self-Pacing Technology Approach**

In the "teacher-in-training" technology courses offered by the Department of Educational Leadership at Middle Tennessee State University, web-based instruction has successfully assisted the process of training preservice students for the challenge of the academically diverse classroom. By facilitating instruction in a way that mirrors the self-pacing so desperately needed to meet the needs of students within a classroom, the preservice course enables students to work at their own pace. They begin at their individual level of technological literacy and moving forward. The course—designed to train the preservice student, as well as, the practicing teacher—utilizes the Internet in order to help students integrate technology into lesson plans and units of instruction. Over the past five years, we have experimented in our *SPSE 322 – Technology in Teaching* course with how to vary the rate of instruction in order to produce the highest rate of learning for all student in the academically diverse groups of future teachers. Not suprisingly each semester, students enrolled in the technology classes are similar to what can be found in the typical public school classroom. The preservice students can usually be categorized into three distinct learning groups with regard to technological literacy levels and pacing:

a) beginners who typically move at a slow pace,
b) intermediate students who move at a moderate pace when completing assignments,
c) advanced users who usually progress forward at a relatively fast pace.

The beginners and the advanced users are usually the smallest in number with each group representing approximately 10 – 15% of each class population.

The course is offered by two different methods:

1. Regularly scheduled classes that meet in the Technology Lab
2. Online class with no scheduled classes except a performance review at the end of the semester to verify that the student actually did the work contained in their portfolio.

In order to allow self-pacing, we have facilitated the Sanders Self-Pacing Model for Classrooms with Varying Student Abilities. Components of the model include:

1. *Web-based Materials* – Using web-based instructional materials with two different delivery methods which include scheduled in-class instruction time for completion of assignments and instructor assistance, and non-scheduled instruction which allows students to work on their own using website instructions and e-mail.

2. *Criterion-Based Assessment System* – Employing a criterion-based assessment system, which enables students to submit

materials in printed form or via e-mail, which is then examined by the instructor. This process also provides an opportunity for the instructor to offer suggestions on how to professionally complete assignments and meet mastery learning objectives.

3. *Reflective Feedback* – Utilizing the process of reflective feedback as students complete each section of their "portfolio" which allows students to rethink, rework, and resubmit each section in order to reach an acceptable or mastery level. In addition, the process provides additional practice on computers and reinforces specific concepts and technological skills.

4. *Pacing* – Encouraging students to work at their own pace—even if this means working ahead of the suggested schedule.

5. *Peer Sharing and Conferencing* – Providing opportunities for students to share and conferencing about projects and products. By encouraging peer sharing and conferencing, the course provides a means for scaffolding with another, more capable person—which is the type of assisted, social learning based on the work of Vygotsky and suggested by Dixon-Krauss (1996).

6. *Alternate Computer Stations* – Empowering students by enabling them to work at off-site computer stations—within the home, computer lab, or library—in order to provide the best possible situation that will foster technological literacy while addressing learning styles and individual pacing.

In addition, a course website is used (http://www.mtsu.edu/~jsanders). The site assists the instructors in:

- Providing examples of each project and assignment
- Developing a course calendar for scheduling specified times for in-class instruction as well as due dates for projects
- Enabling students to view course materials from alternate computer stations
- Making available animated PowerPoint presentations which are utilized throughout in-class instruction, as well as, at alternate computer sites

The outcome of the course is a professional technology portfolio, upon which the final grade is based. The technology portfolio becomes part of the larger professional portfolio, which is required to complete the student teaching experience.

**Performance and Effects of Self-Pacing**

Through the five years that the course has been offered, instructors have kept field journals and completed informal reflections on observations as students engage in computer-assisted activities, complete assignments, and conference with peers. Using the three types of learner groups mentioned above, the following recorded observations are offered for teacher educators in Table 1.

Table 1.

Recorded Reflections of Self-Pacing During In-Class Computer Sessions

*Group 1 – Advanced Computer User/Fast-Paced Learner (10 to 15%)*
Require little or no instruction
Usually work ahead of schedule using the website for reference and instruction
Readily assists and frequently conference with other students around them
Submit assignments on time or ahead of schedule

*Group 2 – Intermediate Computer User/Average-Paced Learner(70 to 80%)*
Gain knowledge from in-class instruction, information on the website, each other, or notes
Require little assistance from instructor after in-class instruction sessions
Actively help others
Submit assignments on time

*Group 3 – Beginner Computer User/Slow-Paced Learner (10 to 15%)*
Must listen carefully during in-class instruction sessions
Require substantial assistance from the instructor
Receive substantial assistance from peers – usually the Average-Paced Learners
Take limited amount of notes, which appear to be of little value
Submit assignments varying from "late" to "on time"

Reflections recorded by course instructors (Middle Tennessee State University *SPSE 322 – Technology in Teaching*) over a period of five years.

During the semester, the class is structured into:

a) one-third "in-class instruction mode," and

b) b) two-thirds "lab mode."

Typically 90 – 95% of the instructor's time is spent assisting the slow-paced learners who make up approximately 10 – 15% of the each class. With extra instruction provided by the instructor and more

capable peers, the beginning computer user (slow-paced learner) usually struggles to keep up with assignments and projects. However, most complete the course and submit a professionally designed technology portfolio. The drop-rate for the course is less than 5% and usually occurs within the first two weeks of the semester.

Throughout the early part of the semester, the class sessions are very structured, but transitions into a very unstructured environment as students become comfortable working on the computers and conferencing with each other. Similar to previous research findings (Craig, 1997), the male students share ideas in a very loose, unorganized manner—beginning early on and continuing throughout the semester. The female students, however, tend to write down problems and solutions and are more apt to share suggestions slowly as work progresses.

All three groups of learners generally meet the target due dates for each section of the technology portfolio. The advanced group/fast-paced learners usually turn in completed portfolios early—ranging from a few days early to several weeks before the semester ends. The intermediate group/average-paced learners, as well as, the beginner group/slow-paced learners submit completed technology portfolios usually on the last day of class. The overall quality and professional appearance is similar for all three groups. The use of creative images, animation, and additional features is scattered with no obvious pattern and seems to be based on the individual student's interest level rather than their pacing group.

Based on teacher observation and informal reflections, the apparent anxiety level, difficulty in asking questions, and increase in student confidence falls into the following general categories as shown in Table 2.

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Anxiety Level With Regard to Difficulty in Asking Questions and Increase in Student Confidence

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*Group One – Advanced Computer User/Fast-Paced Learner*

Anxiety level increases slightly or remains unchanged throughout the semester as assignments are completed. Confidence level increases throughout the semester

*Group Two – Intermediate Computer User/Average-Paced Learner*

Anxiety level is high at the beginning of the semester and decreases as assignments are completed.

Confidence level increases at a constant rate throughout the semester

*Group Three – Beginner Computer User/Slow-Paced Learner*

Anxiety level is very high at the beginning and remains high through most of the semester before decreasing rapidly near the end of the semester. Confidence increases very slowly at the beginning of the semester and then increases dramatically as the semester draws to a close.

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Reflections recorded by course instructors (Middle Tennessee State University *SPSE 322 – Technology in Teaching*) over a period of five years.

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In general, the self-pacing approach has been successful and appears to work well for all three groups of students. The end products—student knowledge gain, technological literacy, and computer skills—are evenly distributed across all three levels of learners. The big difference between this approach and a more traditional approach to technology instruction where a strict schedule for submitting assignments is adhered to is that the amount of assistance and time the instructor is able to provide each student can be altered to meet the needs of individual learners.

**Online Classes**

We have offered this course in an online (Internet-based) mode for 3 semesters. The students work on their own from remote locations. They follow the instructions found on the Internet Site: http://www.mtsu.edu/~jsanders/322-on.htm and attach the portfolio section files to their emails to the instructor. The instructor critiques each assignment and makes appropriate comments or suggestions for the student to follow. The assignment can be resubmitted as many times as necessary to get it to a "professionally accepted standard." The following is a list of the positive and negative aspects of this method:

- **Previous computer experience** – we have found that the instructor must carefully screen the students to determine if they have sufficient computer skills to be able to handle the online mode. Even after screening some of the students lack the computer skills to be able to effectively process the workload. Five to ten percent of online students come to the regularly scheduled classes or to the instructor's office for extra help.
- **Lack of Self Motivation** – A small percentage of the online students do not have the self discipline to get the assignments completed and submitted by the due dates. The students can submit the Portfolio Sections in any order as long as they submit a section for each due date. If a student falls behind schedule, the instructor reminds them of the importance of setting priorities and staying on schedule. If they cannot keep up, then it is suggested that they switch to the regularly scheduled classes.
- **Who's Doing the Work**? – There is always the question is the student actually doing the work without too much help that might hinder them from gaining the desired knowledge and skills. We have a scheduled 2-hour Performance Review at the end of the semester to verify that the student has mastered the basic skills & knowledge. We use 3 short assignments and if the student does not demonstrate proficiency, then they do not pass the course. Assuming that they pass the Performance Review, then their grade is based on the completed, bound portfolio that is kept by the instructor.
- **What do they miss**? The online student certainly misses the modeling of the use of technology in the classroom. However, our courses are sequenced so that they are exposed this in other courses where they have to use technology to present their lesson to their peers.
- **Chat Room or Buddy System Needed** – A survey of the previous online classes revealed that they need to be able to ask for help at times when the instructor is not online. We will be starting aChat Room, Listserv, and/or a Buddy System to help provide that assistance. Presently, we refer one student who needs help to another student who is very proficient in their particular area. This has worked well, but apparently does not fill the void for some students.
- **Online Mode Meets Student Needs** – The online mode has been successful because it meets the needs of students who have scheduling or time conflicts. It also promotes planning and self-motivation which are skills that the preservice or new teacher need to be able to survive their first classroom experience.

**Reflections and Summary**

If teacher educators must assist preservice students in becoming technologically literate, they must design technology courses that enable students to become skilled at integrating technological applications into instruction, as well, as allowing for individual student differences. The method described and the reflections provided are just one way instructors have successfully assisted students in creating a

professional technology portfolio as they develop the skills needed for the classroom. As part of the president's educational technology initiative, a challenge for all students to become technologically literate was issued to America. The challenge falls directly on teacher educators who have the opportunity to provide modeled instructional practices that integrate technology into the curriculum and that enable all students to work at their own pace in becoming technologically literate. By seeking out successful practices, such as, the one described, we can facilitate learning while fostering the level of technological literacy needed by future teachers.

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Craig, D.V. (1997). When the learner is in charge: Technological literacy patterns in student generated inquiry projects for fifth graders. Dissertation Abstracts International, D-1341.

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# Additional Resource

*Technology in the Classroom –SPSE 322* website URL:

- Click http://www.mtsu.edu/jsanders and
- click "SPSE 322"(http://www.mtsu.edu/~jsanders/322.htm ) for regular class and
- click "322 OnLine" (http://www.mtsu.edu/~jsanders/322-on.htm ) for the online class.